

What is claimed is:

1. A method for introducing a foreign matter into a cell, comprising the steps of placing a small particle carrying a foreign matter at a part of a cell surface of a living cell, boring a hole in a cell wall and/or a cell membrane by irradiating and treating said part of the cell surface with a laser beam, and introducing the foreign matter into the living cell.

2. The method set forth in claim 1, wherein the living cell is a cell of a plant, and at least a part of the cell wall of the plant cell is removed.

3. The method set forth in claim 2, wherein said at least part of the cell wall is removed by irradiation with a laser beam or by irradiation with the laser beam and treatment with a hydrolysis enzyme in combination.

4. The method set forth in claim 1 or 2, wherein the small particle is a fine particle having a particle diameter of 0.01 μm to 10 μm .

5. The method set forth in claim 1 or 2, wherein the small particle is a liposome including the foreign matter.

6. The method set forth in claim 1 or 2, wherein the small particle is a bead fixing the foreign matter.

7. The method set forth in claim 6, wherein the foreign matter is fixed by adding an aqueous solution containing at least the foreign matter and a curing agent into a water-in-oil type emulsion having a curable raw material in water, and forming a cured reaction product.

8. The method set forth in claim 7, wherein the curable raw material is sodium alginate, the curing agent is calcium chloride, and the cured reaction product is calcium alginate.

9. The method set forth in claim 1 or 2, wherein the laser is at least one laser selected from the group consisting of a YAG laser, an exima laser, an Ar ion laser, a nitrogen laser and a nitrogen-excited color laser.

10. The method set forth in claim 1 or 2, wherein the foreign matter is at least one material selected from the group consisting of a genetic material, a protein material, an organelle, a physiologically active material and an indicating agent.

11. The method set forth in claim 10, wherein the genetic material is at least one selected from the group consisting of a DNA, a RNA, an oligonucleotide, a plasmid, a chromosome, an artificial chromosome, an organelle DNA and a nucleic acid analogue.

12. A method for introducing a foreign matter into a living cell, comprising the

steps of irradiating a living cell with a laser beam, removing a part of a cell wall and/or a cell membrane of the living cell, and introducing the foreign matter into the living cell from a laser beam-irradiated site with use of a microinjector.

13. A method for introducing a foreign matter into a living cell, comprising the steps of irradiating a living cell with a laser beam, removing a part of a cell wall of the living cell, exposing a part of the cell membrane, placing, on the exposed cell membrane, a liposome including a foreign matter, fusing the exposed cell membrane with the liposome., and thereby introducing the foreign matter into the living cell.

14. The method set forth in claim 12 or 13, wherein the foreign matter is at least one material selected from the group consisting of a genetic material, a protein material, an organelle, a physiologically active material and an indicating agent.

15. The method set forth in claim 14, wherein the genetic material is at least one material selected from the group consisting of a DNA, a RNA, an oligonucleotide, a plasmid, a chromosome, an artificial chromosome, an organelle DNA and a nucleic acid analogue.

16. A method for preparing a spheroplast or a protoplast, comprising the steps of irradiating one or plural cells in a living tissue of a plant with a laser beam, removing a part of a cell wall of the cell or cell walls of the cells, treating the living tissue of the plant with a hydrolysis enzyme, and selectively removing only a cell wall or cell walls around a laser beam-irradiated site of the plant living tissue.

17. The method set forth in claim 16, wherein the living tissue of the plant is at least one selected from the group consisting of a leaf, a root, a stem, a shoot apex, a root apex, an embryo cell, a seed, a pollen, a callus, a suspended cell, an adventive embryo and a hairy root.

18. A transformed body in which a genetic material is introduced into a living cell by using the method set forth in claim 11 or 15.

Same
11, 12

11
12
13
14
15
16
17
18